

QK-A051T Manual

Class B AIS Transponder



Designed in UK



Features

- Low-cost anti-collision / monitoring system
- Receives and processes all AIS message types
- Automatic transmission of vessels own position, speed and heading to other vessels within VHF range
- A method of monitoring the position, speed and heading to other AIS vessels within VHF range
- The ability to plot the progress, changes in heading and speed of other AIS vessels on a PC or Chart Plotter
- Transmitter 'silent mode' facility to conserve power, or for privacy or security
- Compatible with Windows, Mac and Linux (optional Configuration must be completed using Windows software)
- This device can connect to two NMEA 0183 output devices. One NMEA 0183 RS422 and one NMEA0183 RS232
- Can support WiFi connection to 4 devices simultaneously
- This device does not come pre-loaded with map data. We can recommend OpenCPN (free to use) for map data

Contents

1.	Introduction	3
1.1.	How AIS Works	3
1.2.	AIS Classes	3
1.3.	Maritime Mobile Service Identity (MMSI)	4
2.	Mounting	5
3.	Connections	6
3.1.	Status LEDs	6
3.2.	Silent Mode (Mute)	7
3.3.	NMEA/POWER Connection	7
3.4.	USB Connection	8
3.4.1.	USB data check - OceanCom	9
3.5.	Wireless Connections	10
3.5.1.	WiFi: Ad-hoc mode	11
3.5.2.	WiFi: Station mode	11
3.5.3.	WiFi: Standby	11
3.5.4.	WiFi data check	11
4.	Configuration software	12
4.1.	Admin Password	12
4.2.	Serial port Config	13
4.3.	WiFi Config: Ad-hoc, Station mode and Standby	13
4.3.1.	Station mode setup	13
4.3.2.	Standby mode- Disabling WiFi	14
4.4.	Ship Information Config	14
4.5.	Transmission Config – Enable/Disable AIS transmission	15
5.	Chart Software	15
5.1.	OpenCPN example USB setup	16
5.2.	Maps	16
6.	Specification	16
7.	Troubleshooting	18
8.	Limited Warranty and Notices	18
9.	Glossary	19

1. Introduction

This manual provides installation procedures, configuration and safety instructions for the A051T Class B Transponder.

1.1. How AIS Works

AIS stands for Automatic Identification System. AIS is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed over ground (SOG), course over ground (COG) and other information such as vessel identity with similarly equipped craft.

It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped craft. Position is derived from a Global Navigation Satellite System (GNSS) network and communication between vessels is by Very High Frequency (VHF) digital transmissions. A sophisticated and automatic method of time sharing the radio channel is used to ensure that even where a large number of vessels are in one location, blocking of individual transmissions is minimised, any degradation of the expected position reporting interval is indicated to the user and even if the unit suffers extreme channel overload conditions it will always recover to normal operation.

1.2. AIS Classes

There are two classes of AIS transponders that can be fitted to vessels, Class A and Class B. In addition, AIS base stations may be employed by the Coastguard, port authorities and other authorized bodies. AIS units acting as aids to navigation (AtoNs) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

Class A units are a mandatory fit under the safety of life at sea (SOLAS) convention to certain vessels types, including those above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also fit Class A units. Class A AIS units transmit the radio signal at a power level of 12.5 watts, while class B is at 2 watts. Class B units are currently not a mandatory fit but authorities in several parts of the world are considering this. Class B units are designed for fitting in vessels which do not fall into the mandatory Class A fit category, but who still desire or are required for other reasons to transmit their AIS location.

Quark-elec A051T is a class B transponder.

A Class A unit will transmit its IMO number (if known), MMSI, Call sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG), heading, navigational status, rate of turn, draught, cargo type, destination and safety related messages via NMEA transmit facility. Message lengths are variable with static and voyage related information being transmitted less often.

Class A ship messages reporting intervals

Ships dynamic conditions	Rate
Ship at anchor or moored	3 min
Ship 0-14 Knots	10 sec
Ship 0-14 Knots and changing course	3.3 sec
Ship 14-23 Knots	6 sec
Ship 14-23 Knots and changing course	2 sec
Ship > 23 Knots	2 sec
Ship > 23 Knots and changing course	2 sec
Ships Static Information	3 min

A Class B AIS unit is designed to be interoperable with Class A units, but not to impact the Class A network. Many commercial vessels, fishing boat, leisure craft, not classified as requiring a Class A unit, choose to install a Class B unit to avoid accidents at sea. A Class B unit will transmit its MMSI, Call Sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG) only.

Class B ship messages reporting intervals

Ships dynamic conditions	Rate
--------------------------	------

Ship with Speed Over the Ground < 2 Knots	3 min
Ship with Speed Over the Ground > 2 Knots	30 sec
Ships Static Information	3 min

Class A and B AIS Characteristics table

	Class A AIS (SOLAS Compliant)	Class B AIS
Transmit Power	12.5 watts (nominal), 2 watts (low power)	2 watts
Unique Communication Access Scheme	SOTDMA (Self-Organizing amongst Class A's)	CSTDMA (Carrier-Sense polite to Class A's)
Frequency Range	156.025-162.025 MHz @12.5/25 KHz, DSC (156.525 MHz) is required	156.025-162.025 MHz @12.5/25 KHz, DSC (156.525 MHz) and 12.5 KHz are optional
Miscellaneous	External GPS, Heading, and Rate of Turn Indicator are Required	Heading is optional
Safety Text Messaging	Transmits and Receives	Transmit is optional and only pre-configured

1.3. Maritime Mobile Service Identity (MMSI)

IMPORTANT: In most countries the operation of an AIS unit is included under the vessel's marine VHF license provisions. An MMSI number is a unique identifier assigned to a vessel. The International Telecommunications Union (ITU) sets the international conventions for the use of MMSI numbers. An MMSI number is a 9-digit code issued by the host country agency for use in VHF marine radio equipment.

The vessel onto which the AIS unit is to be installed must therefore possess a current VHF radio telephone license which lists the AIS system and the vessel Call Sign and MMSI number.

Please Note: The QK-A051T Transponder will allow you input an MMSI number only once.

Please make sure you input the correct MMSI number before clicking 'config', as changes are not permitted after confirming.

In the box:

- 1 × AIS class B Transponder
- 1 × power/NMEA cable
- 1 × USB cable
- 1 × CD (USB driver)
- 4 × set of nuts, bolts and washers



2. Mounting

A051T comes with an extruded aluminium enclosure to shield it from external RF interference. Four fixing holes can be used to attach it to a suitable surface. It is not waterproof so should be mounted in a dry place on a flat surface. Ideally the LEDs need to be visible to the operator at all times. The ambient temperature around A051T receiver should be maintained between -25°C and $+55^{\circ}\text{C}$. A051T should not be located in a flammable or hazardous atmosphere such as in an engine room or near to fuel tanks.



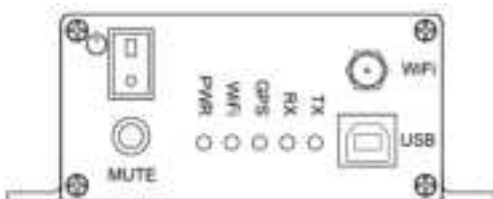
3. Connections

The following figure shows connections for the AIS transponder. The user should take the time to familiarize themselves with the system elements and their connections prior to attempting installation.



- **AIS connection:** a SO239 VHF connector for external AIS antenna. Connect external AIS antenna.
- **GPS connection:** a TNC female bulkhead connector is for external GPS antenna. Connect external GPS antenna.
- **9 pins Power/NMEA connection and cable:** 9-pin coaxial female connector mounted on the enclosure. It provides power input and two NMEA outputs. 1x NMEA 0183 RS422, 1x NMEA 0183 RS232. NMEA 0183 data cable can be connected to plotters or other NMEA0183 compatible equipment.
- **USB:** Micro B USB connector for software configuration and information display on PC. Connect to Windows system for software configuration and information display. (Configuration Software is on the CD provided and as a free download from <http://www.quark-elec.com/downloads/>)
- **WiFi connection:** Connect the external WiFi antenna. The A051T support WiFi output in both Ad-hoc mode and Station mode. The module will work in Ad-hoc mode by default but it can be easily setup to station mode through the Configuration tool.

3.1. Status LEDs



The A051T has 5 LED lights to confirm power and data transfer, and for troubleshooting.

- **TX:** LED will flash for every class B signal transmitted from the A051T.
- **RX:** LED will flash independently depending on the channel signal received. The A051T receives AIS data on channel A (161.975 MHz) and B (162.025 MHz) simultaneously.
- **GPS:** LED will stay lit when GPS connection is established.
- **PWR:** LED indicates Power.
- **WiFi:** LED will flash when AIS/GPS sentences are sent out via WiFi. Unlit if WiFi is set to Standby. See troubleshooting chapter below if LEDs are not functioning in the expected manner.

3.2. Silent Mode (Mute)

Disabling the transmitter and keeping receiving only function has been shown to be very useful due to privacy or security reasons. In some cases, people don't want to transmit the boat position and ID information to other vessels or receiving stations. A051T supports silent mode by providing a mute button on the side panel. The LED on the mute button will keep on to indicate the silent mode is running.

3.3. NMEA/POWER Connection

NMEA data and Power for the A051T comes from the 9-pin POWER/NMEA connector and supplied cable. This has 9 wires separated out for use with your NMEA equipment.



Chart plotter: To display received AIS position reports from other vessels on your chart plotter, you will need to connect your A051T to your chart plotter or NMEA bus. Please refer to the user manual supplied with your chart plotter for details of how to connect and configure your chart plotter for use with AIS devices. For general guidance your chart plotter should be configured to accept NMEA data at 38400 baud (sometimes referred to as 'NMEA HS' or 'NMEA High speed' in the plotter configuration menu). You may also need to enable the display of AIS targets in the chart options.

A051T includes two NMEA outputs:

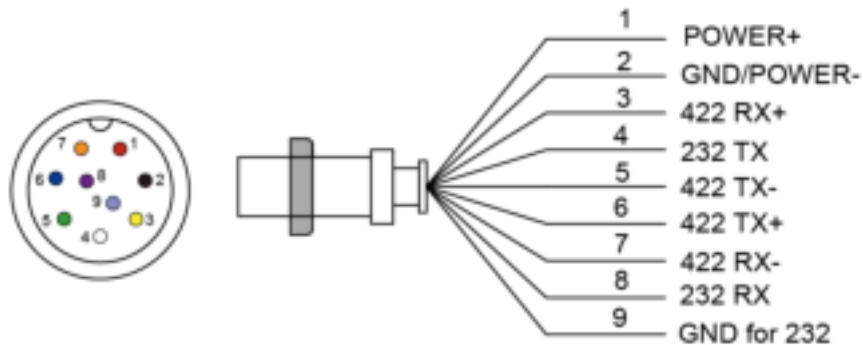
- 1 x NMEA 0183 RS422
- 1 x NMEA 0183 RS232

Check your chart plotter to select the proper connections. Connect either or both outputs to a chart plotter or other device of your choice.

Power/ NMEA Cable Colour Codes:

RS422 R+, R- and RS232 RX are reserved for firmware upgrading.

Pin name	Colour
Power+	Red
GND / Power-	Black
RS232 TX	White
GND for RS232 only	Gray
RS232 RX (reserved)	Purple
RS422 R+ (reserved)	Yellow
RS422 R- (reserved)	Orange
RS422 T+	Blue
RS422 T-	Green



WARNING: Check your wiring very carefully before applying power to the A051T. Failure to wire the product correctly could result in permanent damage.

3.4. USB Connection

A051T is supplied with a USB connector. This connector provides AIS, GPS data output as standard. This USB connector can be linked directly to a USB port on the PC.

Windows: To enable the USB data connection of A051T to other devices, related hardware drivers may be needed dependent on your system requirements.

Windows 7,8,10: the driver can be found on the CD in the packing box or be downloaded from <https://www.quark-elec.com>

The A051T registers itself to the computer as a virtual serial com port. The drivers usually install automatically to your device if it is running an original Windows 10 version. A new COM port will automatically show up in the device manager after plug in.

Mac: For Mac OS X, the A051T will be recognized and shown as a USB modem. The ID can be checked with the following steps:

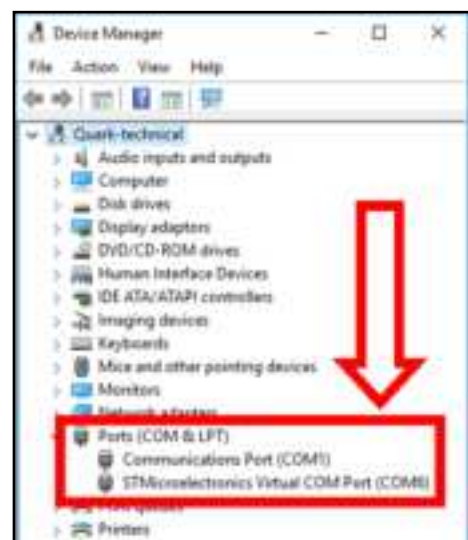
1. Plug the A051T into a USB port and launch Terminal.app.
2. Type: `less /dev/*sub*`
3. The Mac system will return a list of USB devices. A051T will display as - `"/dev/tty.usbmodemXYZ"` where XYZ is a number. Nothing further needs to be done if it is listed.

Linux: No driver is required for Linux. When plugged into the computer, A051T will show up as a USB CDC device on `/dev/ttyACM0`.

Once the driver is installed (if needed), run the Device Manager and check the **COM number**. Your chart software will require your COM number in order to access the data. (Your COM number is the number associated with the USB port you are using. The port number is the number that Windows assigned as an input device. These can be generated randomly by your computer).

The port number for the A051T can be found in Windows 'Control Panel->System->Device Manager' under 'Ports (COM & LPT)'. Look for 'STMicroelectronics...' and the associated COM port.

To change this number (if desired), double click the A051T and select the 'Port Settings' tab. Click the 'Advanced' button and change the port number to the one required.



Operators can also use a Windows system to setup and configure the A051T through the USB port. More details below in the 'Configuration' Chapter.

3.4.1. USB data check - OceanCom

If desired, the USB data input can be checked with OceanCom (Quark-elec's free Com port monitoring application)

The latest version of OceanCom can be download from <https://www.quark-elec.com/downloads/apps/>

To view your raw USB data, enter the following parameters into OceanCom (or the Com port monitoring software of your choice) Com port settings: **Baud rate: 38400bps**, **Data bit: 8**, **Check: None**, and **Stop bit: 1**.

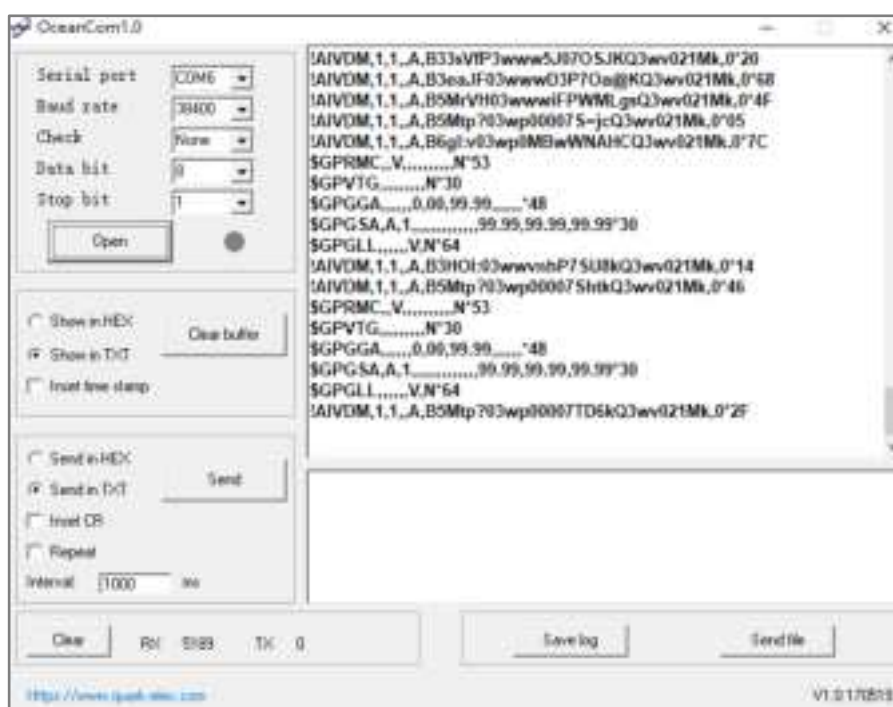


Figure. 1 OceanCom interface

Operators can also use a Windows system to setup and configure the A051T through the USB port. More details below in the 'Configuration' Chapter.

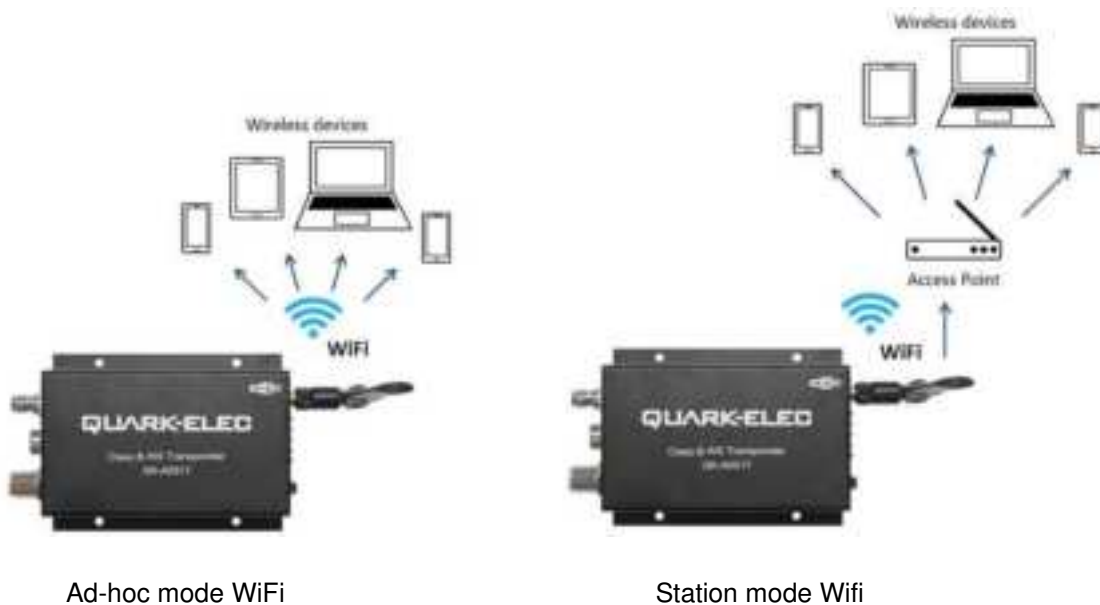
3.5. Wireless Connections

The A051T allows users to view their data wirelessly, on a PC, tablet, smartphone or other WiFi enabled device. Users can access marine data including vessel course, speed and position etc. in their chart software. See chapter [chart software](#). The information below details the connection of the A051T to wireless devices.

A051T features a high-performance Wi-Fi module with Ad-hoc mode and Station mode functionality. Users can receive NMEA 0183 AIS and GPS messages through WiFi connections.

The IEEE 802.11b/g wireless standard has two basic modes of operation;

- Ad-hoc mode (peer to peer) and
- Station mode (also called infrastructure mode).



The A051T supports both:

- In **Ad-hoc mode WiFi**: mobile devices connect directly to another device, without a router or access point. For example, your PC, tablet or smart phone can connect directly to the A051T to receive marine data.
- In **Station mode WiFi**: wireless devices communicate through an access point (AP) such as a router that serves as a bridge to other networks (such as the internet or a LAN). This allows your router to handle the data and traffic from your device. This data can then be picked up through your router anywhere on your local area network. This is similar to plugging the device directly into the router by wire, but instead using wireless technology. In this way, the mobile devices receive both your marine data and other AP connections (for example Internet).

The A051T is set to Ad-hoc mode as default, but can be easily setup to station mode through the configuration tool (GUI).

3.5.1. WiFi: Ad-hoc mode

On your device (phone, laptop etc):

15 seconds after the A051T has powered up, scan from your device (phone, tablet, laptop) for a WiFi network with an SSID similar to 'QK-A051Txxxx'. Connect with the default password: '88888888'.

Device SSID	Similar to 'QK-A051Txxxx'
Default WiFi password	88888888

In your chart software: Set the following connection settings

Device SSID	Similar to 'QK-A051Txxxx'
Protocol	TCP
IP address	192.168.1.100
Data Port	2000

With the above settings, a wireless connection should be established and the user will be able to view their data through the chart software.

Note: In Ad-hoc mode, the IP address should not be changed.

The Ad-hoc password can be changed using the configuration tool.

The password should be between 8 to 12 characters.

If changed, all users wishing to connect Ad-hoc to the A051T will need the new password.

3.5.2. WiFi: Station mode

Station mode WiFi allows your Access Point/router to handle the data and traffic from your device. This data can then be picked up through your router anywhere on your local area network.

This allows your mobile device view AIS and GPS information wirelessly while still receive your other AP functionality including internet if relevant.

Station mode is set up through the Configuration software. See the Configuration Chapter.

3.5.3. WiFi: Standby

The user can switch off the WiFi output by selecting 'Standby' mode if desired. See the Configuration Chapter.

3.5.4. WiFi data check

If needed, the user can always check the wireless connection with a TCP/IP port monitoring software as shown below:



4. Configuration software

A051T transponder must be correctly configured for your vessel before operation. All configuration information must be entered carefully as this information will be transmitted to other AIS equipped vessels and shore stations.

A051T transponder is configured by connecting to a Windows computer running the configuration tool supplied. To active the new configuration, unplug USB and re-power the A051T.

The configuration tool for the A051T is where the user will assign there ships information to the transponder. This information is needed for the transponder to accurately locate and use the class B AIS system. Use the link below to download the configuration tool if not on CD. Configuration tool can only be used on Windows.

<https://www.quark-elec.com/downloads/configuration-tools/>

To Configure the A051T,

- **Connect the A051T to a Windows system via USB (for Mac users, boot camp).**
- Close other programs that would connect to the A051T via USB.
- Run the Configuration tool
- Insert password and check connection to A051T in the bottom row of the tool.

4.1. Admin Password

On first use, the default Configuration password is: 888888. You will need this to open the Configuration software.

For your security, change the Admin password at the bottom left hand side of the screen, once your Configuration software is open.



Figure 2: A051T Configuration tool

4.2. Serial port Config

The Serial port must be Open before any configurations. The port number can be found from 'Device manager' after the driver has been installed (if required.).

Once you have input your settings (see below), Press '**Config**' for each section you have changed. After 60 seconds Click '**Exit**' and repower your A051T.

4.3. WiFi Config: Ad-hoc, Station mode and Standby

A051 supports WiFi Ad-hoc mode, Station mode and Standby mode.
(See WiFi chapter of this manual for more information)

The A051T is set to Adhoc mode as a default.

4.3.1. Station mode setup

QK-A051T is able to join an existing WiFi network in Station mode, by entering the parameters of your Wireless Access Point into the Configuration software as outlined below:

Connect the A051 to a Windows system via USB (for Mac users, boot camp). Run the Configuration tool, checking connection to A051T in the bottom of the tool. Remember to open the Serial port (see above)

1. Change working mode to '**Station mode**'
2. Enter your router's **SSID**.
3. Enter your network **password**.
4. Enter the **IP address** you want to assign to the A051T. Start with 192.168. The third group of digits depend on your router's configuration (Commonly 1 or 0). The fourth group must be a unique number between 0 and 255. This number must not be used by any other equipment connected to your router.
5. Enter your **router's IP address** in the **Gateway** section. This can usually be found on the router. Leave the other settings as they are.
6. Click '**Config**' in the bottom right hand corner.
7. After 60 seconds Click '**Exit**'.
8. Repower your A051T. The A051T will now attempt to connect to your router.

In your chart software set the protocol as '**TCP**'

Insert the **IP address** you assigned the A051T

Enter the Port number as '**2000**' in the chart software

Protocol	TCP
IP address	The IP address you assigned in configuration (or check your router IP address list)
Data Port	2000

You should now be connected and see AIS or GPS targets on your chart software.

If not, check your router's **IP address list** and check the **IP address** that your router has given your A051T.

Occasionally, a router assigns a different **IP address** to a device than the one you chose to assign it during Configuration. If this is the case, copy the **IP address** from the router into your chart software. If the **IP address** in your router's **IP address list** is the same as the one you input into your chart software then everything will work in station mode. If you are unable to see any data repeat the steps, and check all the data has been inputted correctly.



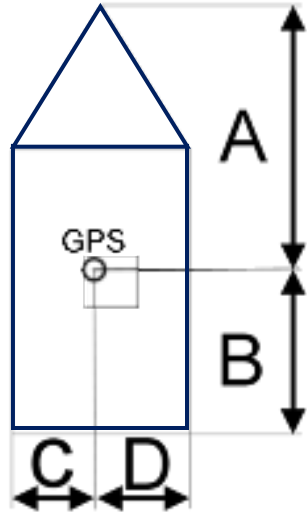
If you are unable to view your data in Station mode, the likely cause is either the data has been input incorrectly, or the IP address is different in your chart software to that of your router.

4.3.2. Standby mode- Disabling WiFi

The user can switch off the WiFi output by selecting 'Standby' mode if desired.

4.4. Ship Information Config

Name	Description
MMSI	Maritime Mobile Service Identity is a unique 9 digit number that is assigned to a (Digital Selective Calling) DSC radio or an AIS unit. Your MMSI number is your unique calling number for DSC radios or an AIS unit. See chapter mobile maritime service identity
IMO	International Maritime Organization number should be entered into this section. The IMO number will be on the hull and certificates for the ship.
CALL SIGN	Call sign for your vessel
Draught	Draught is the vertical distance between the waterline and the bottom of the hull (keel), with the thickness of the hull included. Draft determines the minimum depth of water a ship or boat can safely navigate
Name	Enter the name of your vessel
ETA	Estimated Time of Arrival to destination entered below

Destination	This is the destination your vessel is heading to. This should be entered before every journey ideally.
Ship type	This field should contain a number referring to the type of vessel you are using this transponder on. For example enter the number 36 for vessels using sail propulsion. For example enter the number 37 for pleasure craft (Yacht powered by engine)
Serial port	This refers to the connection you are using between the transponder and the software. Find the right COM port for your transponder and click connect. This information can be found in the device manager on your PC. See chapter check the USB connections.
A B C D	These relates to your size and GPS antenna location. Your ships size is determined by the Data input into the transponder under the section A, B, C, and D (see image above). The transponder must know where your antenna is located to make accurate readings for other ships and your own. Please be as accurate as possible when filling this information in. A: Distance from bow to GPS antenna in metres B: Distance from stern to GPS antenna in metres C: Distance from port to GPS antenna in metres D: Distance from Starboard to GPS antenna in metres 

Note: Some of this information is legally required if using the A051T on water. Please check with your relevant authority or coastguard. Please input this information carefully.
The QK-A051T Transponder will allow you input an MMSI number only once. Please make sure you input the correct MMSI number before clicking 'config', as changes are not permitted after confirming. Unrequired fields can be left blank.

4.5. Transmission Config – Enable/Disable AIS transmission

Silent Mode is for privacy or security purposes. It allows the operator to turn off the AIS transmitter while still seeing AIS transmissions from other vessels. Select 'Disable' on Transmission configuration to switch off AIS transmission.

Once you have input your settings, Press '**Config**' for each section you have changed.
After 60 seconds Click '**Exit**' and repower your A051T.

5. Chart Software

A wide range of chart software is available.

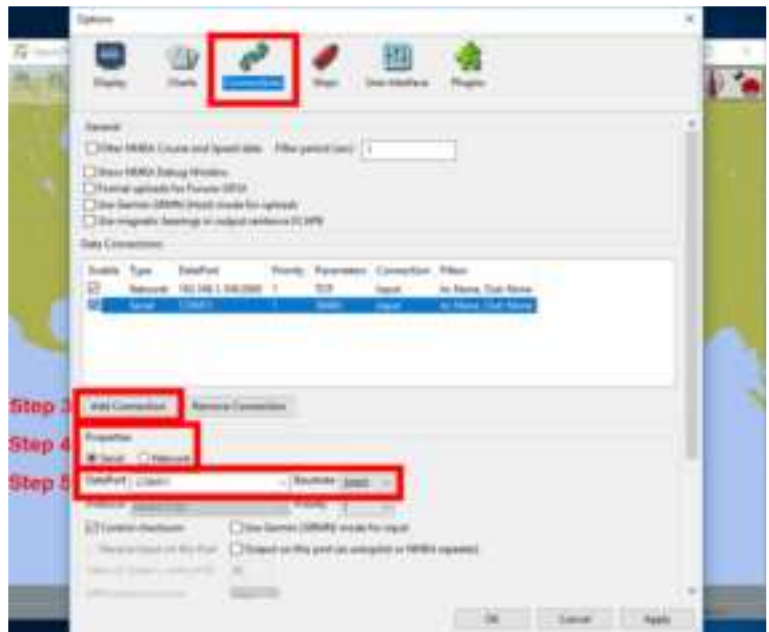
We will use OpenCPN for our example; other software will require similar setup.
(<https://opencpn.org/> OpenCPN (Open Chart Plotter Navigator) is a free software project to create concise chart plotter and navigation software, for use underway or as a planning tool. OpenCPN is developed by a team of active sailors using real world conditions for program testing and refinement.)

5.1. OpenCPN example USB setup

1. When you first open the software you will be greeted with a page similar to the one pictured. To add data to openCPN via your Quark-elec instrument, click on the 'Options' tab at the top. The settings tab looks like a spanner as seen below in the highlighted image.



2. In the options at the top of the menu will be a tab/button that says '**Connections**'. Click on this
3. Click on '**Add Connection**' button highlighted in the picture below.
4. Select '**Serial**'
5. Select from the drop down the **COM** number assigned to A051T (See [connecting via USB](#) for help finding the Com port in your device manager).
Adjust the Baud rate accordingly (38400 covers AIS)
6. Click '**Apply**' and then '**OK**'



To add Wireless data to your charts check the relevant section of this manual (Ad-hoc or Station mode WiFi) for the correct parameters to enter here.

5.2. Maps

OpenCPN interface comes with a basic map view. You can easily download more detailed maps.

There is a wide range of free and licensed charts available in different formats via the OpenCPN website at <https://opencpn.org/OpenCPN/info/chartsources.html>.

A worldwide directory of free nautical charts can also be found on openstreetmap.org. The collection and the updates are community driven.

6. Specification

Item	Specification
Standard	IEC 62287,ITU-RM.1371,IEC 60945, IEC 61162
NMEA 0183	38400 bps
Sensitivity	-110 dBm

Power	2W
Channel A	CH87B(161.975MHz)
Channel B	CH88B(162.025MHz)
Input Level	9.6V-36.0V
Transmit Mode	CSTDMA
Bandwidth	25 KHz
Bit ratio	9600 bps
Consumption	< 4 W
Working Temperature	-15°C~55°C
Store Temperature	-25°C~70°C
Humidity	0~95% RH at 40°C
Water resistance	IPx2

7. Troubleshooting

Phenomenon	Trouble Part	Possible Reason	Solution
RX LED fails	AIS channel	NMEA 0183 port disconnection	Reconnect cable
GPS LED fails	GPS antenna	Disconnection or loose	Check the connection
TX LED fails	Serial port	Serial definition fault or disconnection	Check configuration tool to check report rate
PWR LED fails	Power cable	Cable disconnection	Check if the connection is correct
WiFi LED fails	WiFi transmission	WiFi disconnection	Check WiFi antenna is well connected. Check WiFi is not set to Standby mode.
PWR LED flashes	Power cable	Power supply is out of defined range	Set or transfer power level within defined range

8. Limited Warranty and Notices

Quark-elec warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Quark-elec will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Quark-Elec. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs. A returns number must be given before any unit is sent back for repair. The above does not affect the statutory rights of the consumer.

This product is designed to aid navigation and should be used to augment normal navigational procedures and practices. It is the user's responsibility to use this product prudently. Neither Quark-elec, nor their distributors or dealers accept responsibility or liability either to the product user or their estate for any accident, loss, injury or damage whatsoever arising out of the use or failure to use this product.

Quark- products may be upgraded from time to time and future versions may therefore not correspond exactly with this manual. The manufacturer of this product disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

WARNING: The transponder must be installed and configured in conformity with the provided instructions in the manual in order to maximize the device performance.

WARNING: DO NOT DISASSEMBLE OR MODIFY THE EQUIPMENT. Improper disassembly or modification could cause personal injury and will invalidate the guarantee.

WARNING: It is important to know that AIS is designed for the purpose of anti-collision and serves to complement navigation. It is not the absolute navigational equipment and does not replace any navigational system installed on board. Please bear in mind that not all vessels are equipped with AIS transponders and therefore may not be visible to this transponder. Likewise, certain conditions including the environment, improper use, and overcrowded port traffic, may exist whereby the vessel equipped with an AIS transponder is not visible to other AIS users.

WARNING: Never Switch on the AIS transponder without a VHF antenna connected.

WARNING: Ensure the WiFi antenna has at least 20 cm free space around it and is not covered.

Document history

Issue	Date	Changes / Comments
1.0	14-06-2019	Initial release
1.01	10-12-2019	Support silent mode (mute button)
	08-04-2021	Manual revision

9. Glossary

- **Ad-hoc WiFi:** devices communicate directly with each other without a router.
- **Station mode WiFi:** devices communicate by going through an Access Point(AP) or router.
- **IP:** internet protocol (ipv4, ipv6)
- **IP Address:** is a numerical label assigned to each device connected to a computer network.
- **Router:** A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.
- **NMEA 0183:** is a combined electrical and data specification for communication between marine electronics
- **MMSI (Maritime mobile service identity):** is a unique 9 digit number that is assigned to an AIS transponder. Similar to a cell phone number, your MMSI number is your unique calling number for that AIS transponder.
- **IMO (International Maritime Organization):** is a unique identifier for ships and for registered ship management companies. For ships, it consists of the three letters "IMO" followed by the seven-digit number assigned to all ships
- **Draught/Draft:** is the vertical distance between the waterline and the bottom of the hull (keel), with the thickness of the hull included

Quark-elec (UK)
Unit 7, the Quadrant
Newark close
Royston, UK
SG8 5HL

